(5) Mr. Gladstone has produced one of the best local faunas that we have seen, although it seems almost a pity that, in order to save space, the Latin technical names are omitted from the index, as are, for the same reason, almost all references to authorities. Another peculiarity of the index is that it includes local and Gaelic names which are not given in the body of the work. Thus the entry, "Briskie (Chaffinch), 20," represents the only appearance of the former word. It is interesting to find that, contrary to the predictions of objectors, writers of local faunas have not been slow to adopt the most recent advances in nomenclature. Thus Mr. Gladstone's list of Dumfriesshire birds includes several sub-species, whilst amongst his mammals are found many of the most newly unearthed genera (such as Nyctalus for the Noctule), for which we are indebted to the laws of priority. He has not, however, ventured into sub-species of mammals, and, indeed, it is difficult to see how a local writer can do so until an authoritative text-book has been issued. It is most useful to find the mammals extinct within prehistoric or historic times included, such as the urus, elk, reindeer, wolf, and brown bear; but by a curious mistake the wild boar is sandwiched between the mountain hare and rabbit. Space does not permit allusions to the amphibia, fishes, and reptiles.

(6) Mr. Claude Morley's small volume on two tribes of Ichneumonidæ is the first of a series, for which, as we are informed by Dr. Harmer, we are indebted to Mr. Morley's having undertaken to bring a very large accumulation of unsorted specimens at the British Museum into order, these, as it appears, not having been arranged since Frederick Smith left them in 1860. The two tribes included in the "Revision" have been selected on account of considerations of an entirely practical nature, and not because their close association is indicated by a study of their respective systematic positions. It is not surprising to find that the author brings forward a somewhat large proportion of apparently new species, with a few additional genera, on the possession of all the types of which the national collections may be congratulated. Many of these have long been awaiting description, Mr. H. W. Bate's rich South American collection made during 1848–1859 affording a particular instance. The book includes one coloured plate by Mr. Rupert Stanton of a British example of the widespread *Ophion luteus*. The descriptions and notes on geographical distribution appear to have been very carefully drawn up, and the author states that he has been able to consult practically all the literature. The volume will be most valuable to students.

CONCERNING HEAT.

(1) *Heat Engines.* By H. A. Garratt. Pp. xii + 332. (London: Edward Arnold, n.d.) Price 6*s*.

(2) *Modern Destructor Practice.* By W. F. Goodrich. Pp. xvi + 278. (London: C. Griffin and Co., Ltd., 1912.) Price 15*s*. net.

(3) *Barker on Heating: the Theory and Practice of Heating and Ventilation.* By A. H. Barker. Pp. xvi + 640 + lxxvi. (London: J. F. Phillips and Son, Ltd., 1912.) Price 25*s*. net.

(1) IN this volume Mr. Garratt follows along the paths trodden by most writers of elementary text-books on heat engines, but with considerable discrimination and judgment, which has resulted in a very concise and readable work for the technical student. The difficulties of presenting even elementary thermodynamics to students imperfectly equipped with mathematics are well known to every teacher, and various expedients have to be devised to bridge the gaps left by mathematical shortcomings. The author skips from one equation to another when the connecting link involves a knowledge of the calculus, as, for instance, when deriving the work done by a gas expanding adiabatically. Such omissions are quite justifiable, for the earnest student can make good the hiatus either concurrently or afterwards.

With some exceptions of this kind, the thermodynamic part of the book is very straightforward, and especially the method of dealing with that fugitive quantity "entropy," in which the author steers clear of the hopeless redundancy and mysticism which various writers bring to bear with the worthy object of making things clear. Probably there is no part of the subject of thermodynamics which is at the same time the object of so much pedagogic endeavour and resists the attacks so well. We are glad to find a well-written chapter on the mechanism of reciprocating engines, for a thorough understanding of the fundamental principles of slide valves and motions is the best equipment for the mechanical engineer. The steam turbine is given a chapter to itself, in which the various forms of turbine combining different degrees of the "reaction" and "impulse" types are described with their mechanical details.

The introduction to the theory of the steam turbine through that of the water turbine is not happy, and the student of steam turbines will find it convenient to forget Bernouilli's equation when dealing with an expanding gas. Though the author alludes to the difference, the analogy is so far from complete that it would be better to treat the steam turbine as arising directly from the flow of an expanding gas. The author is well up to

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date in his chapter devoted to the internal combustion engine, for he describes that latest, most ingenious, and economical pump due to Mr. Humphrey. This volume should prove very welcome to engineering students. The illustrations are excellent, and numerical exercises with their answers bear upon the principles discussed in each chapter.

(2) Many of those who have not given attention to the subject are still under one of two false impressions concerning destructors and the disposal of city waste. Either it is supposed that a destructor has no other utility than getting rid of the leavings of our streets and houses, or else that the calorific value of refuse is so low that to make electricity out of it would be impossible, or, in fact, to use the heat generated for any other useful purpose. The book before us will tend to dispel such impressions, and the reader will be grateful to Mr. Goodrich for putting together much information concerning the construction, working, and economy of destructors in Great Britain, the Continent, and America. It will be gratifying to English engineers to learn that the author is "able to place on record the proved superiority of the British destructor in many countries." He shows how, one by one, city authorities are abandoning the methods of land and sea dumping, and are adopting some kind of incineration as the best means for disposing of waste. In connection with sewage works, it has been found that, unless the lift is very high, the refuse burnt in a destructor will maintain steam for pumping, and Epsom is cited as a case in point where not only is the sewage of the town dealt with, but that of several large institutions of the London County Council. The tables of costs in connection with electricity works are especially instructive as showing what may be done towards reducing the coal bill by burning refuse. It would perhaps have been better if the analysis of refuse from American cities had been compared with that from English cities, and some deductions drawn therefrom. The descriptions of actual destructors, which occupy the greater part of the volume, show what strides have been made in recent years.

(3) This bulky volume on heating and ventilation should possess some interest to others than those connected with the heating and ventilating trades, but it is so loaded down with empirical formulæ that it requires a nice discrimination on the part of the reader to separate the chaff from the wheat. It might, indeed, be regarded as a treatise on the physics of the subject, though much of the subject-matter, especially the elementary matter at the beginning, might safely be omitted. It is generally superficial, though the author may be excused from this charge on the ground that he has to crowd in such a mass of material. A work of this description should prove advantageous, as so much of our heating and ventilation is done in a haphazard and unscientific manner.

PSYCHOLOGY IN BUSINESS.

Increasing Human Efficiency in Business. A Contribution to the Psychology of Business. By Prof. W. D. Scott. Pp. v+339. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1911.) Price 5*s.* 6*d.* net.

THIS work is a genuine attempt to develop the application of reasoned methods to the organisation of the human element in industry and commerce. The opening chapter, on "The Possibility of Increasing Human Efficiency," sets out with the proposition that the output of work, whether of brain or muscles, by the average individual is very far below the maximum possible; that in most cases the individual would gain in health and happiness if his efficiency were judiciously developed, and that the general gain to the community through this development would be correspondingly great. In the concluding paragraph of this chapter the author says: "In the succeeding chapters will be described specific methods, many of which are employed by individual firms, but which could be used by other business men, to ensure their own efficiency and that of their employees. The experiences of many successful houses will be linked to the laws of psychology to point to the way that will bring about greater results from men." In the eight chapters which follow, "Imitation," "Competition," "Loyalty," "Concentration," "Wages," "Pleasure," "The Love of the Game," and "Relaxation" are treated of as means of increasing human efficiency. The final chapters deal with "The Rate of Improvement of Efficiency," "Practice plus Theory," "Judgment Formation," and "Habit Formation."

The author makes no attempt to define the sense in which he uses the term efficiency. For the most part it appears that he is considering efficiency from the point of view of the business organiser or from that of the type of manufacturer "whose razors *may* be made to shave, but certainly *must* be made to sell." But that other criteria of efficiency are not absent from the author's mind is evident from the outset, for in the first chapter the illustrations of efficiency are often culled from regions of human activity very far removed from commerce and industry. For example, on p. 13 the walk of Mr. Weston, aged 70 years, from New York to San Francisco, at

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